in their forms, mutual relations, details of structure, function, and chemical constitution, often reproduce with great fidelity all the peculiarities of the species, as well as some of the more special peculiarities of the special breed, of the family, and of individual ancestors.

The geneticists, after correlating the various genes with various adult features, commonly leave untouched the vast series of changes which, if their view is sound, must causally connect each gene with all the adult features in whose genesis it takes part. And, if the required theory is to be in physico-chemical terms, it must be predominantly chemical. For, as we have seen, each of the genes, though it has its normal serial position in a chromosome, has no fixed spatial position in the cell; for the chromosomes undergo many and great changes of position. That is to say, the morphogenetic processes in which the genes are assumed to play the dominant role must be more like the successive chemical reactions in a flaskful of chemicals mixed in watery solution than like the processes of a typical machine in which all depends upon the setting up and maintenance of precise spatial relations.

It is this series of changes which Goldschmidt attempts to sketch out very roughly. He takes the production of specific surface patterns as typical of the problem; and in that he is probably justified; for the production of a specific surface pattern through a series of chemical changes taking place in a mixture of substances whose spatial relations are haphazard and variable within wide limits, presents in simplified two-dimensional form the

essential problem; How shall a chemical mixture devoid of all specific spatial pattern generate or reproduce highly complex systems of precise spatial arrangement in three dimensions? He finds some evidence in support of